

CoCoRaHS - June 2008



Image provided by Howard Runions TN-DY-1

This month we'd like to include some information from the National Cooperative Observer (NCO) newsletter. The past two months David Easterling and Tom Karl, of the National Climatic Data Center in Asheville, North Carolina have addressed some frequently asked questions concerning climate change. I've included a few of their questions in our [eNewsletter](#). You'll find the question on the Water Cycle very pertinent to the CoCoRaHS observations, particularly concerning variability.

If you'd like to see the entire article you can access it on the [NCO website](#) by clicking on the [Winter 2007](#) and [Spring 2008](#) editions. The final part will be in the Summer 2008 edition yet to come. Thanks for continuing the great work we've started here in Tennessee. The data gains value with every observation.

Joanne, Craig, Zwemer, & Ralph

Article quoted below:

Global Warming: Frequently Asked Questions

This article is based on a brief synopsis of the 2007 Fourth Assessment Report (AR4) by the Intergovernmental Panel on Climate Change (IPCC), as well as National Climatic Data Center's (NCDC) data resources. One of the most hotly debated topics on Earth is the issue of climate change, and the National Environmental Satellite, Data, and Information Service (NESDIS) data centers are central to answering some of the most pressing global change questions that remain unresolved. NCDC contains the instrumental and paleoclimatic records that can precisely define the nature of climatic fluctuations at time scales of a century and longer. Among the diverse kinds of platforms whose data contribute to NCDC's resources are ships, buoys, weather stations, weather balloons,

satellites, radar and many climate proxy records such as tree rings and ice cores.

What is the greenhouse effect, and is it affecting our climate?

The greenhouse effect is unquestionably real and helps to regulate the temperature of our planet. It is essential for life on Earth and is one of Earth's natural processes. The greenhouse effect is the result of heat absorption by certain gases in the atmosphere (called greenhouse gases because they effectively "trap" heat in the lower atmosphere) and re-radiate downward some of that heat. Water vapor is the most abundant greenhouse gas, followed by carbon dioxide and other trace gases. Without a natural greenhouse effect, the average temperature of the Earth would be about zero degrees F (-18°C) instead of its present 57°F (14°C). So, the concern is not with the fact that we have a greenhouse effect, but whether human activities are leading to an enhancement of the greenhouse effect by the emission of greenhouse gases through fossil fuel combustion and deforestation.

Are greenhouse gases increasing?

Human activity has been increasing the concentration of greenhouse gases in the atmosphere, mostly carbon dioxide from combustion of coal, oil, and gas; plus a few other trace gases. There is no scientific debate on this point. Pre-industrial levels of carbon dioxide, before the start of the Industrial Revolution, were about 280 parts per million by volume (ppmv); current levels are about 380 ppmv. The global concentration of CO₂ in our atmosphere today far exceeds the natural range over the past 650,000 years or 180 to 300 ppmv. According to the IPCC Special Report on Emission Scenarios (SRES), by the end of the 21st century, we could expect to see carbon dioxide concentrations of anywhere from 490 to 1260 ppm, 75%-350% above the pre-industrial concentration.

Is the climate warming?

Global surface temperatures have increased about 0.74°C (plus or minus 0.18°C) since the late-19th century. The linear trend for the past 50 years of 0.13°C (plus or minus 0.03°C) per decade is nearly twice that for the past 100 years. The warming has not been globally uniform. Some areas (including parts of the southeastern U.S. and parts of the North Atlantic) have, in fact, cooled slightly over the past century. The recent warmth has been greatest over North America and Eurasia between 40 and 70°N. Lastly, seven of the eight warmest years on record have occurred since 2001; the 10 warmest years have all occurred since 1995.

Is the Water Cycle Changing?

Globally-averaged precipitation over land shows a statistically insignificant upward trend with most of the increase occurring in the first half of the 20th century. Further, precipitation changes have been spatially variable over the last century. On a regional basis, increases in annual precipitation have occurred in the higher latitudes of the Northern Hemisphere and southern South America and northern Australia. Decreases have occurred in the tropical region of Africa, and southern Asia. Due to the difficulty in measuring precipitation, it has been important to constrain these observations by analyzing other related variables. The measured changes in precipitation are consistent with observed changes in stream flow, lake levels, and soil moisture where data are available and have been analyzed. Northern Hemisphere snow cover extent has consistently remained below average since 1987, and has decreased by about 10% since 1966. This is mostly due to a decrease in spring and summer snowfall over the Eurasian and North American continents since the mid-1980s; however, winter and autumn snow cover extent has shown no significant trend for the Northern Hemisphere over the same period. Clouds are also a key indicator of climate change. Surface-based observations of cloud cover suggest increases in total cloud cover over many continental regions. This increase since 1950 is consistent with regional increases in precipitation for the same period. Global analysis of cloud cover over land for the 1976-2003 period show little change.